

advantage over those RespOrgs who have played by both the letter and spirit of the rules.

Bell Atlantic believes that the actions of these RespOrgs is not in the public interest and that they should not be allowed to profit from their conduct. However, that is precisely what will happen if the Commission does not intervene to require them to return these numbers and to set strict number reservation rules for the future.

It has been suggested that the exchange carriers could offer portable 888 access before next April. This is simply not possible. The industry did not decide to open the 888 code until January of this year, and in March the exchange carriers had finalized their 888 implementation plan. The April date is based upon commitments from suppliers, which the suppliers say cannot be improved. These include:

- Changes in service switching point software in exchange carrier end offices and access tandems throughout the country. Today, this software is capable of launching database queries only for calls to 800 numbers and must be modified to handle 888 calls. The switch manufacturers have indicated that these modifications will not be available until the fourth quarter, with some upgrades not available until December.
- Changes in the software in the 800 databases in exchange carrier networks and in the national 800 service management system, scheduled for December.

After the new software has been delivered, the exchange carriers need 60 days to install and test it. These tests will be followed by 30 days of inter-networking tests between exchange and interexchange carriers, as defined by the national Network Operations Forum. The April 1996 target is ambitious and cannot be accelerated.

#### Options for Commission Action

There are several steps the Commission can take that would ameliorate the current situation. None of them will be supported by all segments of the industry – if these measures had universal support, they would have been implemented already. However, Bell Atlantic believes that Commission action is necessary to protect the public.

1. Reclamation. The facts suggest that some RespOrgs have been taking numbers for which they have no legitimate paying customers. The Commission could require these RespOrgs to return these numbers to the database for assignment.

2. Numbers for real customers only. At the same time, the Commission could require that RespOrgs take numbers only if they certify that they have legitimate paying customers for them.

3. Limit the quantity of numbers assigned. The Commission could set a limit on the quantity of numbers that can be taken in order to stretch the supply to last until 888 access is available. Without any reclamation activities, this would mean that each of the 133 entities that were RespOrgs as of May 1 would be able to use approximately 133 numbers per week from now until April 1996.<sup>3</sup> Any numbers that could be reclaimed would add to this quantity.

At the same time, in order to ensure that this process was effective, the Commission would have to freeze the existing RespOrg base. Recent weeks have seen a sharp increase in interest in becoming RespOrgs. In the first two years of 800 database service, the number of RespOrgs increased by only 32, to a total of 133. However, that number grew by an additional five during the month of May, and there are now nine more RespOrg applications in the pipeline. The Commission should consider determining whether these are all legitimate new providers or if some are simply clones of existing carriers, created either to cloak current abuses or in the hopes of getting more numbers under rationing.

4. 888 NXX access. While Bell Atlantic could get its network ready to provide 888 NXX access within three months, it is unlikely that this service could be universally deployed or used by 888 service providers in so short a time. It could conceivably take almost as long for 888 NXX access to be ready for use as 888 database access.

In order for 888 NXX access to be useful to customers, of course, it would also have to be deployed by the other Bell companies and by non-Bell exchange carriers. 800 service providers would have to upgrade their networks and database systems to handle 888 numbers. The industry, which has been unable to agree on number conservation measures, would have to agree on NXX assignment guidelines (or the Commission would have to impose them). NXXs would be assigned, and the new routing arrangements implemented in each exchange carrier network.

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<sup>3</sup> This figure was calculated by dividing the number of available numbers as of June 3 (761,651) by the number of RespOrgs as of May 1 (133) by the number of weeks until April 1996 (43). This method would give each RespOrg the same ration of numbers each week. The Commission could also allocate numbers on some other basis, such as in proportion to currently assigned numbers or 800 minutes of use.

Moreover, 888 NXX access has a number of drawbacks. First, many providers of 800 service would not be able to use 888 NXX access, in particular those carriers which rely on the 800 database to perform number translation functions.<sup>4</sup> Second, 888 NXX does not provide number portability - customers with 888 numbers would be locked in to their carrier until 888 database was implemented. Third, the transition from 888 NXX to 888 database would be far more complicated than implementing database access directly and would impose significant costs on all members of the industry. Fourth, this two-step process would delay 888 database access by several months. Finally, it will cost the exchange carrier industry millions of dollars to implement NXX access, a significant cost for a service that will be useful for only a short time.

If you need any additional information, please do not hesitate to call me.

Sincerely,

*Maxie Breslin*

cc: K. Levitz  
M. Newman  
J. Keegan  
M. DeLuca

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<sup>4</sup> Most exchange carriers would provide 888 NXX access not by means of any database arrangement, but rather through six-digit screening in end office or access tandem switches.

Sent  
6-9-95FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C. 20554

IN REPLY REFER TO:

June 9, 1995

Mr. Michael Wade  
President  
Database Service Management, Inc.  
6 Corporate Place  
Room PYA - 1F286  
Piscataway, NJ 08854-4157

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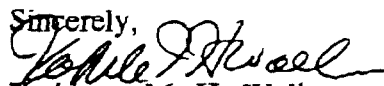
Dear Mr. Wade:

The National Local Exchange Carrier 800 Product Team has informed the Commission that 800 number assignment may completely exhaust as quickly as August 1995, instead of October 1995, as previously projected. We asked the team to identify procedures that can be put in place immediately to slow the rate of 800 number assignment.

One option identified by the team is to temporarily suspend processing and granting of all new or pending Responsible Organization (RespOrg) applications. This measure would assure that RespOrgs would not be able to "clone" themselves in order to reserve more 800 numbers and thus accelerate exhaust. A temporary suspension of six months from June 12, 1995, through December 13, 1995, will fix the total number of RespOrgs at the current level and slow number assignment. It is our understanding that this action would not result in a denial of 800 service because: (1) an applicant who attempts cloning already has a method to assign 800 numbers; and (2) any other applicant may use the services of any existing RespOrg to obtain 800 numbers.

By issue of this letter, we direct Database Service Management, Inc. (DSMI) to cease the processing and granting of RespOrg applications as of 12:01 a.m., June 12, 1995. We require DSMI to inform RespOrgs with pending applications who have not: (1) returned the necessary forms to DSMI; (2) received a credit check; and (3) obtained the proper insurance, that further processing of their applications will be suspended for six months. After that time, we will review the 800 environment and determine whether further action is necessary.

Should you have any questions, please call Mary De Luca at (202) 634-1855.

Sincerely,  
  
Kathleen M. H. Wallman  
Chief, Common Carrier Bureau

FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C. 20554

IN REPLY REFER TO:

June 21, 1995

Mr. Michael Wade  
President  
Database Service Management, Inc.  
6 Corporate Place  
Room PYA-1F286  
Piscataway, NJ 08554-4157

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Dear Mr. Wade:

On June 13, 1995, the Common Carrier Bureau responded to the accelerating depletion of the remaining available 800 numbers by directing the Database Service Management, Inc. (DSMI) to limit to two hundred (200) per week the amount of 800 numbers a Responsible Organization (RespOrg) could assign collectively to either "working" or "reserved" status. DSMI has confirmed our understanding that this will result in 28,000 numbers being assigned each week while conservation measures remain in effect. This action also returns the rate of consumption of the public resource represented by 800 numbers to the level upon which the industry premised its schedule for introducing 888 toll free dialing numbers.

As we have repeatedly stated since the industry first invited us last month to explore alternatives for ensuring a smooth transition from 800 to 888 numbers for toll free calling, our preference is that the tools used to achieve a smooth transition be the result of industry consensus. Members of the industry have now told us that while the industry supports our decision temporarily to limit the total weekly number of 800 numbers assigned from the Service Management System (SMS), at least some segments of the industry recommend that we reexamine the way that total is allocated among RespOrgs. They suggest that it would be more equitable and less disruptive for the Bureau to replace its "per capita" conservation plan with a "market share" allocation plan, in which DSMI would allocate a maximum of 28,000 800 numbers per week among the RespOrgs in proportion to the percentage of 800 numbers each RespOrg held in "working" or "reserved" status during a period of time specified by the FCC.

Assuming that the affected parties find a market share based plan more reasonable, and that no unforeseen downside is discovered, we are committed at this point to pursuing this idea. In exploring the feasibility of such an approach, we have learned that there are certain apparently significant, but not necessarily insurmountable, implementation problems with a market share allocation plan that is based upon "market share" data for each RespOrg. First, DSMI will need several days to assemble the "market share" data needed to introduce such a system of allocation. Second, DSMI will need additional time to develop software for the SMS to assign an individual percentage of numbers to each RespOrg.

While we are analyzing the data needed to introduce a market share allocation plan and even before the additional system software work is completed, we believe that the following approach would permit the introduction of such a plan:

1. At the beginning of each business week, DSMI would assign each RespOrg a block of numbers equal to its allocated share of 28,000 numbers as shown in the attached list;
2. Until we can perform more refined analysis of the data, each RespOrg will receive a minimum of twenty-five (25) numbers a week. Since there are 138 RespOrgs (LDDS, Wiltel and EDS are counted as one RespOrg entity, as are RCI New England and Frontier Communication International), 3,450 numbers will be taken from the total of 28,000 to meet this allotment, leaving 24,550 to be assigned as follows:

*In addition to its base of twenty-five (25) numbers, each RespOrg will receive a share of the remaining 24,550 numbers that equals the product of 24,550 and the percentage of all 800 numbers in working, assigned, and reserved status on August 1, 1995, held by that RespOrg on August 1, 1994.*

3. The RespOrg would place these numbers in one of three categories: (a) reserved; (b) working; or (c) hold status. The last category would be used to describe those numbers unassigned to any customer of the RespOrg; and
4. At the end of each business week, each RespOrg must return to DSMI any numbers in "hold" status.

To permit the Bureau to audit compliance with the last condition, we will require until further notice that each ResPorg submit to DSMI, by noon Wednesday of each week, a written report containing the following information:

1. A list of all 800 numbers the RespOrg received from DSMI during the preceding week;
2. A statement of the number of 800 numbers that the RespOrg received from DSMI during the preceding week, and that were returned to DSMI because they remained in "hold status" at the end of the week;
3. A list of the 800 numbers the RespOrg received from DSMI during the preceding week that were in reserve status at the end of that week; and
4. A list of the 800 numbers the RespOrg received from DSMI during the preceding week that were in "working status" at the end of that week.

Mr. Michael Wade  
Page 3.

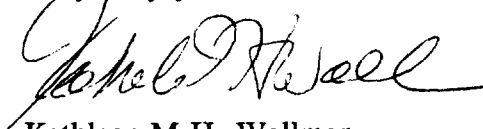
For the top nine RespOrgs with the largest amount of combined working, assigned, and reserved 800 numbers, we also require that these lists and statements be accompanied by a certification executed by an official within the RespOrg's organization with overall responsibility for preparation of those lists and statements. The official shall certify that such lists and statements have been examined and reviewed, and are true, correct and complete, and that any number not returned to DSMI at the end of the business week covered by the certification is either in working or reserved status for a specific customer. We attach a copy of the certification form that the officer must execute. These lists, statements and certification will continue even after the software is introduced by DSMI that will automatically allow for the assignment of each RespOrg's allotment.

By this letter, DSMI is directed to assign 800 numbers in accordance to the procedures outlined above until further notice by the Commission. Further, we increase the maximum time a RespOrg may have an 800 number in reserve status from fifteen (15) days to forty-five (45) days; and we remove the incentive that any RespOrg may retain 25% of the 800 numbers returned to the "transition" status. However, the 25% incentive should apply for the week of June 13, 1995 through June 20, 1995.

Compliance with this order is to begin at 12:01 a.m., eastern time, Thursday, June 22, 1995. RespOrgs will be entitled to retain the two hundred (200) numbers they took between June 13, and June 20, 1995 under our per capita conservation plan, but must return to DSMI any numbers in "hold" status under the procedures outlined in this letter. We also ask that you send by facsimile a copy of this letter to each RespOrg to notify them of the procedures discussed above.

We continue to seek ways to refine our 800 conservation program so that it can serve the industry's needs more effectively and preserve the public resource represented by 800 numbers until 888 numbers are available. Thank you for your cooperation.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'Kathleen M.H. Wallman', written in a cursive style.

Kathleen M.H. Wallman  
Chief, Common Carrier Bureau

Attachments

[Company name]

**CERTIFICATION<sup>1</sup>**

I, [responsible officer, title], hereby certify that:

1. I have overall responsibility for preparation of the following information submitted to the Federal Communications Commission:
  - A. The list of all 800 numbers received by [company's name] from DSMI during the week beginning [date];
  - B. The statement of the number of 800 numbers that [company name] received from DSMI during the week beginning [date] that remained in "hold" status at the end of that week and were consequently returned to DSMI;
  - C. The list of the 800 numbers [company name] received from DSMI during the week beginning [date] that were in "working" status at the end of that week;
  - D. The list of 800 numbers [company name] received from DSMI during the week beginning [date] that were in "reserve status" at the end of that week.

2. I am authorized to execute this certification.

Based upon information provided to me by employees responsible for the determination of, or supervision of the determination of, the status of each 800 number received from DSMI during the week beginning [date], I hereby certify that the lists and statement described above have been examined and reviewed, and are true, correct, and complete.

Date:

[signature]

[name]

[title]

---

<sup>1</sup> Making willful false statements related to the lists and statements that are the subject of this certification may lead to fine or imprisonment under provisions of 18 U.S.C. Section 1001.



FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C. 20554

IN REPLY REFER TO:  
August 17, 1995

Mr. Michael Wade  
President  
Database Service Management, Inc  
6 Corporate Place  
Room PA - 1F286  
Piscataway, NJ 08854-4157

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Dear Mr. Wade:

When we implemented our 800 number conservation plan earlier this summer, we simultaneously announced that the initial plan likely would be refined in light of future reflection upon the data and experience. This letter describes the further refinements we wish DSMI to make based upon our study of the data and our experience to date and based upon thoughtful input from the industry and other affected parties.

Background

Faced with the accelerating depletion of 800 numbers that it could not control, the industry asked the Common Carrier Bureau in June 1995 to take extraordinary measures to ensure that 800 numbers would remain available until such time when 888 toll free numbers could be introduced.

On June 6, the Bureau directed the Database Service Management, Inc (DSMI) to cease the processing and granting of Responsible Organization (RespOrgs) applications for six months to prevent existing RespOrgs from "cloning" themselves. On June 13, following a week in which 113,000 800 numbers were taken from the database, we took additional measures to slow, even further, the rapid depletion of 800 numbers by directing DSMI to: 1) limit to two hundred (200) numbers per week the amount of 800 numbers a RespOrg may assign to either working or reserved status; 2) reduce the aging process to four months; 3) reduce the amount of time a number may remain in "reserve" status from a maximum of sixty days to a maximum of fifteen days (this was later changed to forty-five days); and 4) reduce the amount of 800 numbers a RespOrg can reserve at any one time to 3% of its existing 800 numbers.<sup>1</sup> We believed these measures would return the rate of consumption of the public resource represented by 800 numbers to the level upon which the industry premised its original schedule for introducing 888 toll free numbers.

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<sup>1</sup> We subsequently removed the 3% reservation limit because under the revised allocation plan currently in effect each RespOrg receives a fixed amount of 800 numbers each week and must certify at the end of the week that each 800 number is assigned to a customer or has been returned to the database.

Mr. Michael Wade

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Soon after implementation of our "per capita" allocation plan, we received a number of requests from the RespOrg community suggesting that a plan more reflective of the actual allocation of 800 numbers would be more equitable and less disruptive to the industry. On June 21, we refined our allocation plan by utilizing a "market share" approach whereby each RespOrg would receive a fixed percentage of the 28,000 800 numbers available for reservation each week. That fixed percentage was based on data concerning 800 number consumption during August 1994. Under the plan, each RespOrg would receive a minimum of twenty-five (25) numbers per week and a share of the remaining 24,550 numbers that equals the product of 24,550 and the percentage of all 800 numbers in working, assigned, and reserved status on August 1, 1994 held by that RespOrg on August 1, 1994. In addition, to demonstrate their compliance with the plan, RespOrgs were to provide DSMI with certain information each week. The nine RespOrgs with the largest amount of combined working, assigned and reserved 800 numbers were required to include with these reports a letter executed by an official within the RespOrg's organization with overall responsibility for preparation of the information certifying that the data submitted was accurate.

To meet industry needs, we proceeded with our market share allocation plan even though it was developed quickly based on data from only one month. When we adopted the plan, however, we announced that we intended to reexamine the plan once we were able to obtain and analyze market share data for all of calendar year 1994.

Since implementation of our initial plan, we have heard from a number of small volume Resp Orgs, new to the market, who have argued that the plan does not fairly account for them as newcomers. They argue that they were not yet even RespOrgs when the August 1994 "snapshot" was taken, and that a plan based on such a snapshot is bound to underserve their needs. Some RespOrgs also argue that the current plan is weighed too much toward historical market share -- i.e., embedded market share and does not adequately reflect growth trends in the industry. Those making this latter argument are not confined to small or new Resp Orgs.

#### Description of the New Plan

After weighing these concerns and reviewing the RespOrg data you provided for 1994, we are refining our allocation plan to take into account not only each RespOrg's market share but also change (i.e., growth) in its working numbers. We believe this approach, explained in detail below, is more rational and more sensitive to competitive trends than the current plan because it not only considers the market share of each RespOrg at a specific point in time, but also the growth that RespOrg experienced in 1994. This new plan better reflects the dynamic nature of the toll free market, while still furthering our goal of conserving 800 numbers until 888 is deployed.

This new plan also appears to match quite accurately each RespOrg's actual consumption of numbers under the current allocation plan. We base this conclusion on data covering the last

Mr. Michael Wade

Page 3

three weeks in July, 1995 that listed each RespOrg's take rate of reserved numbers for the previous week. We found that some RespOrgs used all their allocated numbers while others did not. This implies that there are RespOrgs who may need more numbers (i.e., those RespOrgs who consistently used all their allocated numbers) and RespOrgs who do not need as many numbers assigned to them (i.e., those RespOrgs who consistently did not use their allocated share). The current plan did not meet these different needs, which may also account for the relatively large percentage of the weekly allotments of numbers that have been returned unused to the database each week.

This refined plan also addresses concerns raised by Industry Canada and sets aside 1,500 numbers for the three Canadian RespOrgs (Stentor, United and Sprint-Canada). We deem it essential to do this in the interest of international comity. To adjust at least partially for this additional set aside, we increase the weekly allocation to approximately 29,000 numbers per week. Based on ongoing reports regarding the remaining number of resources, we believe that we can increase the weekly allocation to 29,000 numbers without increasing the risk that the 800 database will be totally depleted before the 888 code can be opened. We also set aside 1200 numbers for "new" RespOrgs who came into existence after December 1, 1993. This number is based on the percentage of growth these new RespOrgs had as a group in 1994 compared to the growth in working numbers for all RespOrgs. In addition, we have assigned an initial allocation of fifteen (15) numbers to "established" RespOrgs (those in existence prior to December 1, 1993) and twenty (20) numbers to new RespOrgs. We believe that fairness and equity require that we take these steps for "new" Resp Orgs.

For established RespOrgs, our new plan assigns a weight to each RespOrg's market share as of December 1, 1993, and another weight to growth in working numbers during calendar year 1994. The weighing factor assigned to market share and growth was based on the number of months between May 1993, when 800 numbers became portable and December 1994, when growth in 800 numbers dramatically increased due to reports of imminent exhaustion, or twenty (20) months. As of December 1, 1993, seven months had passed since 800 numbers became portable. We therefore assigned a weighing factor of .35 (7/20 months) to each established RespOrg's market share as of December 1, 1993 to develop the market share factor. The weighing factor assigned to growth was based on the remaining months, or .65 (13/20 months), which was multiplied by each RespOrg's change (i.e., growth) in working numbers over this time period to determine each RespOrg's growth factor. The sum of the market share and growth factors were then multiplied by the total weekly allocation of 800 numbers. An additional fifteen (15) numbers were added to each established RespOrg's weekly share of 800 numbers.

The method for determining the weekly share of 800 numbers to new RespOrgs is slightly different because these RespOrgs do not have market share data for all of calendar year 1994. Using available data for each new RespOrg through May, 1995, we calculated the average change in working numbers for all new RespOrgs and compared this average to the average growth of all RespOrgs (new and established) during calendar year 1994 to

Mr. Michael Wade

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determine the total weekly 800 allocation for all new RespOrgs. Using this method, new RespOrgs accounted for approximately 4.2%, or 1160 numbers, of the total change in working numbers of all RespOrgs. From the pool of 1160 numbers available to new RespOrgs, an initial allocation of twenty (20) numbers was made to each new RespOrg. The remaining numbers available from this pool were then distributed to each new RespOrg based on its individual growth factor.

Because a small number of new RespOrgs have little or no data available to develop an accurate growth factor and are currently receiving the minimum allocation under the current plan (25 numbers), we adjusted the weekly allocations for these RespOrgs slightly, resulting in an additional 40 numbers for the new RespOrg pool, or a total of 1200 numbers. First, we calculated the difference of their average unused allocation for the last three weeks in July and their current allocation of twenty-five (25) numbers and, second, compared this result to the allocation they would have received under the revised plan discussed above. The higher of these two figures would become the weekly allocation to a small subset of new RespOrgs.

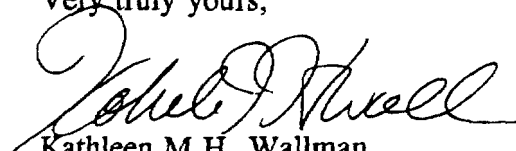
This plan would continue our reporting and certification requirements set forth in our letter dated June 21, 1995. We further clarify that any RespOrg that does not use its full weekly allocation of numbers must file a report indicating how many numbers they did not use the prior week.

#### Effective Date of New Plan

By this letter, we direct DSMI to assign each RespOrg its new weekly allocation, as shown in column C in the attached spreadsheet, by 12:01 a.m., August 21, 1995. Further, we instruct DSMI to treat these data as confidential and not to share with any RespOrg information contained in the attached spreadsheet unless it relates to that RespOrg's weekly allocation of 800 numbers. We also direct DSMI not to allow any RespOrg to reserve new 800 numbers if that RespOrg has not met its reporting and certification requirement. If you have any questions please contact Mary De Luca at (202) 418-2334 or Brad Wimmer at (202) 418-2351.

Thank you for your cooperation in implementing this plan.

Very truly yours,



Kathleen M.H. Wallman  
Chief, Common Carrier Bureau

DOCKET FILE COPY ORIGINAL

**Personal Communications Industry Association's  
Proposed Approach For The  
Toll-Free Resource**

**July 19, 1995**

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1	Conventional and SS7 Signaling Configurations
2	Voice Mail Systems and DID 800 Numbers
3	Efficiency Comparison of DID vs. PIN 800 Arrangement

## 1.0

### INTRODUCTION

The Federal Communications Commission (FCC) staff has suggested the paging industry use Personal Identification Numbers (PIN), in combination with a standard 10-digit North American Number Plan (NANP) number, to access toll free paging services. This suggestion is made as a possible solution to meet the increased demand for called party pays (800 toll-free) resources. The growing use of these toll free numbers is due in part to two significant factors. First, 800 numbers are used for a growing number of subscribers and services, including small and large businesses, residential lines, pagers, voice mail, calling cards, Integrated Voice Retrieval (IVR) systems, announcement services, and other innovative services. Second, 800 number subscribers have become increasingly sophisticated and have developed a variety of telecommunications needs.

This report examines the issues and problems associated with the use of PIN dialing arrangements for the provision of messaging services. In addition, this report proposes that, in light of the significant technical, business, and public interest considerations, the opening of new Service Access Codes (SAC) is the logical and reasonable way to provide additional toll-free number resources without the necessity for PIN dialing arrangements.

PCIA is opposed to any restriction or requirement that toll-free number access for paging services be limited to a PIN arrangement for subscriber calling. PIN-based paging services are: (1) technically inferior; (2) less efficient in the use of PSTN network resources; (3) anticompetitive because of the additional dialing requirements; and (4) preclude the use of SS7 technology for future paging and enhanced PCS services.

## 2.0

### **BACKGROUND**

For the reader's convenience, the following sections describe Special Access Codes, Dialing Arrangements, and the manner in which the paging industry has utilized them. They also provide support for the paging industry's conclusions that PIN technology is not substitutable for many paging uses and would, if required to be implemented, substantially degrade toll free paging services and would put paging carriers at a competitive disadvantage vis a vis their landline and wireless service competitors.



## 2.1

### SPECIAL ACCESS CODES

Special Access Codes (SACs) are three digit codes that allow carriers and subscribers to enter into uniform billing arrangements under which either the caller or the called party pay for calls. Before SACs were available, toll call scenarios (dialing 1 + 10 digits) required the caller to pay for all charges associated with the completion of the call. SACs were created to allow the called party to pay the charges and thereby offer toll-free service to the caller. For the purposes of this report, only the called party pays (or toll-free) uses of SACs will be discussed.

Currently, 800 is the only SAC available to subscribers for toll-free calling. The Industry Numbering Committee (INC), under the auspices of the Industry Carrier Compatibility Forum (ICCF), assigned 888 as the next toll free SAC to provide relief for the 800 number resource, which is expected to be depleted by early 1996. In anticipation of future demand, INC also reserved the numbers 877, 866, 855, 844, 833, and 822 as additional toll free SACs. The designation of a toll free SAC is purely a marketing arrangement; there are no longer any technical requirements restricting the INC from choosing any area code configuration as an SAC. The seven codes referred to above that the INC has currently assigned for toll-free growth, to increase the capacity beyond the 800 resource, contain approximately 56 million individual assignable numbers. (This excludes the 16 million additional numbers that could be made available if the 8XX-100 and 8XX-000 series were able to be assigned.)

## 2.2

### CURRENT DIALING ARRANGEMENTS FOR PAGING CARRIERS

Paging carriers currently are able to offer non-geographic numbers to their customers via two possible dialing arrangements within a toll-free SAC. Both methods of accessing messaging services via toll-free numbers maintain the called party pays billing arrangement.

Under the Direct Inward Dialing (DID) method, customers can access toll-free messaging services by dialing eleven (1 + 10) digits. The second method of accessing messaging services on a toll free basis requires the customer to dial eleven digits, and then to wait for the messaging service to answer, at which point the customer is then asked (typically by a recorded announcement) to enter a Personal Identification Number (PIN), in order to be connected to the desired service. Currently, there are no technical standards for PIN interconnections other than LEC tariffs for permissible subscriber connections. For the purposes of this report, 7 digit PINs will be assumed. Under this assumption, with PIN technology, a total of 18 dialed digits is required to set up a call to a paging subscriber.

The paging industry currently uses both DID and PIN arrangements for subscriber paging applications. The paging subscriber's specific communications needs and the paging carrier's business decisions determine whether DID and/or PIN interconnection is available to subscribers. As set forth below, DID numbers are essential or preferred in most applications because they allow subscribers (and the serving carrier) to benefit from SS7 services, are accessible even from rotary phones without operator intervention, and allow callers to retain the "ease of use" associated with other calls over the public network.

## 2.3

### THE PAGING INDUSTRY – UTILIZATION OF 800 NUMBERS

Toll free 800 DID numbers are very attractive business tools that allow business and consumers to be reached anywhere, any time on a toll free basis, thus allowing them considerable flexibility in meeting their own business and consumer needs. Interexchange Carriers (IXCs), Local Exchange Carriers (LECs) and the paging industry have responded to the demands of their customers, in particular in the business environment, with a myriad of services using 800 numbers. Traveling subscribers are no longer tied to geographic area codes, and can offer their own customers the ease of communications (including paging) via a toll-free number. Although all customers of the telecommunications world have benefitted from the use of 800-type numbers, this report will concentrate on the specific needs of the paging industry.

PCIA estimates, based on conversations with its members, that the paging industry only accounts for a maximum of 500,000 of all 800 numbers, the bulk of which appear to be utilized on a DID basis. This total represents only 7% of the total 7.1 million 800 numbers assigned, although many wireline customers forward their business and/or residential 800 numbers to a paging device. Even including paging services that are forwarded from business or residential 800 numbers, however, paging providers currently are responsible for only a fraction of total existing 800 number use. Because of the many additional services that are rapidly becoming available, PCIA anticipates that the demand by paging for access to toll free SAC codes will continue to grow rapidly.

As shown below, 800 numbers provide PSTN access to a great variety of “paging” communications services:

#### Current Paging Services Accessed by 800 Numbers

Numeric Display Paging  
Alphanumeric Paging  
Alphanumeric Paging with Voice Mail  
Alphanumeric Paging with Data  
Alphanumeric with FAX  
Voice Mail  
Voice Mail with Numeric Display Paging

Voice Mail with Alphanumeric Display Paging  
Voice Paging  
Voice Paging with Voice Mail  
Data

As noted, PSTN originated messages destined for "paging" numbers include voice, numeric, alphanumeric, text data and image data. It is not possible to adequately interconnect most of this traffic to the paging systems using subscriber level PIN connections. The following service features require a DID interconnection:

- 11 Digit access
- Forwarded Call capability
- Rotary Dial Telephone access
- FAX capability
- Automatic (Rotary) Retrieve of Voice Mail
- Announcement services
- Any services that are used in "public" applications.

In general, paging services that are used by business, public safety, government or other agencies must have general public access capability using a standard 11 digit NANP number. One would not expect to see a PIN number listed on a billboard or in a telephone directory, and a PIN access arrangement is unusable for any business that competes with other businesses that use standard 7 or 11 digit NANP numbers. Currently, many "personal" 800 numbers are used to provide very innovative services such as ordering movies on cable TV, personal FAX storage, school closing announcements, weather and sports information, stock market news, restaurant listings, long distance calling cards, private residential, etc.

**DIRECT INWARD DIALING IN THE SS7 ENVIRONMENT****Advantages of SS7 Technology**

The telecommunications industry is in the process of expanding the traffic capacity and routing capabilities of the Public Switched Telephone Network (PSTN) through the deployment of Signaling System 7 (SS7) technology. SS7 in its most generic form is defined as a call-setup signaling format, transmitted over a data circuit separate from the voice path. SS7 technology also allows the introduction of Advanced Intelligent Network (AIN) services. See figure 1 for a comparison of conventional PSTN and SS7 networks.

SS7 is configured as a data network overlay to the existing PSTN. Using the SS7 network for administrative functions has increased the overall efficiency of the voice network by 10% to 15%. Administrative functions include the monitoring and supervision of the dialed number, answer supervision, call termination, etc. Trunking efficiencies are gained when the data network establishes contact with the distant-end switch prior to connecting the voice circuit. The use of voice circuits for trunk signaling, which is required for PIN paging, is a costly and inefficient interconnection that is many times slower than the high-speed SS7 data network. By identifying the availability and call routing prior to establishing the voice circuit, the use of SS7 for paging interconnection saves trunk costs and capacity normally used on busy or invalid calls.

Importantly, the migration of paging interconnections to SS7 also sets the stage for the introduction of AIN services. The AIN services will incorporate customer database information allowing the public to fully integrate all of their telecommunications services and control call routing. The customers using AIN services will have added ability to screen or block calls, routing enhancements based on time-of-day and/or day-of-week, and customized services to best meet their individual needs.

The benefits of trunking efficiency and enhanced AIN services are derived from the delivery of the Calling Number Identification (CNID) prior to the call set up. The CNID is the

subscriber's unique network address. The format of the CNID, as defined by the industry, is NPA-NXX-XXXX (I.E. a 10-digit DID number.)

#### SS7 Technology Cannot Be Used with PIN Arrangements

SS7 based services, however, cannot be used with PIN calling arrangements because PIN systems require that each "address" or subscriber in the system have a unique PIN number in addition to a common shared 10 digit PSTN number. In effect, this means that each PIN subscriber (assuming 7 digit PINs are assigned) would have an 18 digit telephone number. The SS7 network, in contrast, is designed only to work with a maximum 10 digit number.

For example, a call to a number utilizing a PIN arrangement requires that the caller first dial the 10 digit PSTN access number and wait for the call to "complete." All PSTN and SS7 network functions are also "completed" to the 10 digit access number at this time. However, the caller accessing a number utilizing a PIN arrangement also must dial the PIN number that defines the subscriber's "address". Without the subscriber's "address" or PIN number, the called number information necessary to do a database lookup function does not exist. As a result, a PIN paging arrangement would preclude a paging subscriber from: (1) forwarding calls intended for their pager number; (2) forwarding calls that originated from a predesignated NANP number; or (3) forwarding calls to some other NANP location. This is because the caller cannot dial the PIN number until after the call "completes" to the common access number. The called system cannot use or receive AIN functions after the caller dials a PIN number. Alternatively, a call to a 10 digit DID number directly defines the NANP "address" and can be instantly sent by the SS7 network to be used for the database lookup of information necessary for the AIN functions.

The following list of AIN services are only available with DID arrangements that use SS7 technology:

Anywhere call pick-up  
Call Volume Distribution  
Do-not-disturb

Calling Name Delivery  
Customized Intercept  
Flexible call forwarding

Calling Name on call waiting  
Data Security  
Follow me service

Interactive Response Unit  
Single number calling  
Remind me Service  
Personal Communications Services

Local Polling  
Voice activated dialing  
Message T & R Service

Network ACD  
Wake up Service

The current AIN switching standards have not defined any AIN service to accommodate the PIN dialing arrangement. If customers using toll-free numbers to access their pagers are forced to use PIN arrangements, they will not have any of the above list of services available to them. Paging carriers mandated to provide only PIN arrangement for toll-free services, will be forced to stop abruptly the natural evolution to advanced technologies.

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Subsequent sections discuss examples of some messaging services and the problems associated with required PIN technology deployment. These examples are intended to highlight the technical issues in an understandable fashion.

#### 4.0

#### VOICE MAIL AND PAGING

A popular feature offered by voice mail service providers and PBX equipment suppliers is outbound notification to a pager upon receipt of a voice mail message. See figure 2. Under this service, when a caller leaves a message on a subscriber's voice mail, the voice mail system is preprogrammed to dial an eleven digit paging number followed by an optional second specified (preprogrammed) number. The subscriber is thus notified that he has a voice mail message. The second level of preprogrammed numbers can be the called party's extension number, a set code which holds special meaning for the paged subscriber, or the office number. Some companies use this feature to better educate the paged subscriber. For example, a company may choose to send a "911" for voice mails that are marked urgent, or "411" for informational non-urgent messages. This feature is available as a DID arrangement only. The second preprogrammed number required for this service cannot be used reliably with systems utilizing PIN technology because of the lack of industry standards that define timing and call processing procedures in PSTN switches. In addition, voice mail systems and PBXs are generally not equipped to handle calls to PIN paging arrangements because these systems have very limited capabilities for an expanded numbering plan that requires multiple dialing sequences. Voice mail and PBX systems would require extensive hardware and software modifications to call numbers that go beyond the standard NANP 10 digit format.

Furthermore, voice mail services that are used to terminate calls forwarded from other locations in the PSTN cannot be used with PIN arrangements for three reasons. First, under PIN arrangements, the caller will be connected to the 800 access number and not to the desired voice mail box. In forwarding situations, even if economically viable, manual operator assistance is not feasible because the caller may not be aware of the paging subscriber's identity. In addition, most PIN paging in use today does not provide any operator default. Second, the caller may not be at a touch tone telephone. PIN arrangements require the use of touch tone telephones. Finally, the caller is not likely to know the required PIN number. In contrast, calls made under DID arrangements can be easily



forwarded to a DID 800 number used for paging/voice mail, because the forwarded call is connected directly to a voice mail announcement that explains how to leave a message in the same manner as any answering machine or wireline voice mail service.